

REMARKS

Claims 1-65 are currently pending. Claims 1-33 are withdrawn. Claims 34, 45, and 52 are amended herein.

Rejections Under 35 U.S.C. §103

Claims 34-65 are rejected under 35 U.S.C. §103(a) as being unpatentable over the “admitted prior art” in view of U.S. Patent No. 6,179,691 to Lee et al. Applicants do not admit that the “admitted prior art” actually is prior art, but for purposes of examination, Applicants will distinguish the claimed invention from the “admitted prior art” so it will not be necessary to determine whether it is actually prior art.

Independent Claims 34 and 45 have been amended to recite detecting, during electrochemical mechanical deposition, a change in the characteristic of the reflected beam of light indicative of a degree of planarization to the top surface of the workpiece. Independent Claim 52 has been amended to recite obtaining a signal indicative of a degree of planarity of the top surface during electrochemical mechanical deposition.

Applicants respectfully request entry of these amendments. These amendments are fully supported by the specification, as originally filed, at, for example, page 12, lines 8-22. No new matter is added by these amendments and no new search is required. Claims 34 and 45, as originally filed, recited a method for detecting planarization of a top surface of a workpiece with features *in an electrochemical mechanical deposition process*. These claim amendments are made merely to clarify that the method takes place *during electrochemical mechanical deposition*.

Neither the “admitted prior art” nor Lee et al. teaches or suggests detecting, *during electrochemical mechanical deposition*, a change in the characteristic of the reflected beam of light indicative of a degree of planarization to the top surface of the workpiece. As noted by the Examiner, the “admitted prior art” does not teach a method for detecting planarization or obtaining a signal indicative of planarity of a top surface of the workpiece. The Examiner contends that Lee et al. teach a method of optical end-point detection suitable for a copper CMP process, so it would be obvious to combine Lee et al. with the admitted prior art.

Lee et al. do not teach endpoint detection to determine planarization of material that is *being deposited* by electrochemical mechanical deposition *during* deposition, as recited in

Claims 34, 45, and 52, as amended. In contrast, Lee et al. disclose a method of endpoint detection for a copper CMP process, which *removes an already deposited* metal layer. Lee et al. teach to remove all copper from the surface of a dielectric and to detect the endpoint of the CMP process “where no more copper (and therefore no more copper isotopes) is removed from the surface of the dielectric layer” when “radiation will not increase any further.” See Lee et al., at Col. 6, lines 52-64. Lee et al. do not teach or suggest detecting the degree of *planarization* or obtaining a signal indicative of *planarity during electrochemical mechanical deposition* of a material *being deposited*, as recited in Independent Claims 34, 45, and 52 (as amended).

As discussed in the specification, at page 3, line 19 – page 4, line 11, electrochemical mechanical deposition (ECMD) is a form of *planar* deposition using a workpiece surface influencing device (WSID) where there is close proximity, either physical contact or a slight spacing, and relative motion between the workpiece surface and the WSID. During ECMD, the workpiece surface is pushed against the surface of the WSID or vice versa when the surface of the workpiece is swept by the WSID and *planar deposition* is achieved due to this sweeping action. See Specification, at page 5, lines 8-14.

Although the “admitted prior art” teaches electrochemical mechanical deposition, which is *planar deposition*, the “admitted prior art” provides no motivation for detecting the degree of *planarization* of the top surface of a workpiece *during electrochemical mechanical deposition*. The material deposited by an electrochemical mechanical deposition process is already substantially planar and there no recognition in the prior art for detecting the degree of planarity of such a deposited layer. The claimed invention is therefore not obvious in view of either Lee et al. and the “admitted prior art.”

Claims 34, 45, and 52, as amended, are therefore patentable as they are not obvious in view of the admitted prior art and Lee et al., either alone or in combination. Claims 35-44, 46-51, and 53-65 are also patentable because they depend from, and include all of the limitations of, Claims 34, 45, and 52, which are patentable, as discussed above. Furthermore, each of the dependent claims recites further distinguishing features of particular utility.

Appl. No. : 10/017,494
Filed : December 7, 2001

Conclusion


Applicants respectfully submit that all of the pending claims are patentably distinguishable and allowable over the prior art of record. The cited references, either alone or in combination, do not teach or suggest the claimed invention.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: Jan. 25, 2005

By: 
Tina Chen
Registration No. 44,606
Attorney of Record
Customer No. 20,995
(415) 954-4114

W:\DOCS\TZC\TZC-2247.DOC
011205